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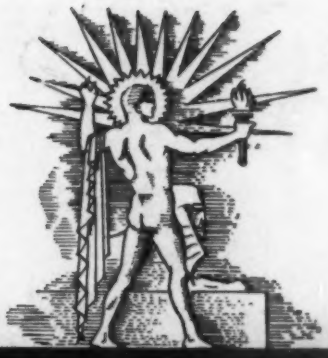
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



JANUARY 12, 1935

Relic of the Past

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A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXVII *No. 718*

The Weekly Summary of Current Science

Published Every Saturday by

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Edited by WATSON DAVIS

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DO YOU KNOW?

Golden tweezers were used by some of the ancient Mexicans to pluck their sparse beards.

Primitive men complete their growth of permanent teeth somewhat earlier than civilized men.

Moscow's planetarium has been visited by three million persons in the five years of its existence.

When completed, the Grand Coulee Dam in Washington State will be twice as high as Niagara Falls.

Fossil ostrich eggs found in China are about a third larger than the biggest eggs of living ostriches.

Instead of naming children after parents, some primitive tribes have the custom of naming parents after their children.

About 30 instances of quintuplet births are known from medical literature, but none in which all babies lived more than a few days, until the famous Dionne quintuplets arrived.

Most bears include insects in their diet.

Toy soldiers were carved for Eskimo children to play with, many centuries ago.

Almost 85 per cent. of Egypt's 15,000,000 people depend, directly or indirectly, upon agriculture.

British excavators have found five Viking houses on an inlet of the Shetland Islands.

A therapeutic pool for treatment of infantile paralysis patients is planned for the University of Michigan Hospital.

A nautical almanac, dating from 467 A. D., and written on papyrus in Greek, is a record of interest to astronomers.

A problem before the pulp and paper industry is to develop wood pulps suitable for chemical transformation into artificial silk, lacquers and cellophane.

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ASTRONOMY

Star Eclipse Reveals Iron, Nickel and Aluminum

Heavenly Twins, the Binary Zeta Aurigae, Provide Opportunity Thrice Each Eight Years for Observation

CELESTIAL twins, a pair of giant suns revolving round and round each other millions upon millions of miles out in space, are revealing to astronomers secrets of star composition never before known for any other stellar object in the whole universe outside of our own sun.

How scientists found that these distant stars contain such common elements as aluminum, iron, nickel and hydrogen was disclosed to the astronomical section of the American Association for the Advancement of Science.

The celestial twins are the two stars which make up the binary star known as Zeta Aurigae to the astronomers.

One of the two stars in Zeta Aurigae is some 25,000 times as large as the other. As the smaller one passes behind the larger and its light is cut off in the stellar eclipse, astronomers have conditions of observation rivalling the almost ideal one which they might set up in a laboratory if they could.

The perfection of eclipse conditions on Zeta Aurigae makes possible the observations demonstrating what kind of atoms create the light in the outer gaseous layers of the dual star which extend out into space for thousands of miles.

As in the case of a total solar eclipse, the occasion of a stellar eclipse is the only time it is possible to analyze this outer shell starlight.

In three papers by Drs. W. H. Christie and O. C. Wilson of Mt. Wilson Observatory; Dr. P. T. Oosterhoff, also of Mt. Wilson; and Dr. Frank C. Jordan of Allegheny Observatory, the new discoveries about Zeta Aurigae were disclosed.

An analysis of the outer vaporous chromosphere starlight shows that atoms of iron, nickel, titanium and aluminum are present. Light hydrogen gas was also found, plus atoms of calcium and titanium in an ionized state, wherein a charge of electricity—an electron—had been stripped from them.

The year 1934 has been an especially fortunate one for observing the eclipses of Zeta Aurigae, for only three times in eight years do eclipses occur.

"At these times," explained Drs. Christie and Wilson, "the small hot star is passing behind the extended, tenuous atmosphere of the large one. As a result the spectrum of the smaller star shows the absorption lines due to the atoms composing these portions of the atmosphere of the larger one lying in the line of sight." By analyzing these spectral lines astronomers are able not only to tell what kind of atoms are to be found in the outer layers of the big star but have indications about the heights at which the various kinds of atoms may be found.

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GENETICS-ASTRONOMY

Genes' Exact Locations Demonstrated to Public

FOR the first time, the public were given an opportunity to see the exact locations of genes, the submicroscopic units that determine the course of heredity, when the annual exhibit of the Carnegie Institution of Washington opened.

Powerful microscopes carried slides mounting specially prepared cells showing recently discovered detailed structures in their chromosomes. The positions of the genes are correlated with these band-like markings. Enlarged diagrammatic charts show the positions of certain known genes, and tell the particular influence of each. Finally, a collection of "yeast flies," the tiny insects used in the experiments, show the particular heredity effects that follow the loss or displacement of some particular gene.

The exhibit was under the supervision of Dr. Thomas Hunt Morgan, research associate of the Carnegie Institution, who recently was awarded a Nobel Prize for his widely known pioneer work in the study of heredity. With him, and directly in charge of the exhibit, were two Carnegie Institution staff members, Drs. C. B. Bridges and M. Demerec, who have done much research on the newer developments demonstrated.

The sun's forty nearest neighbor stars, all within a comfortably close radius of sixteen light years, were also on display in model form. The model consists of vari-colored little globes suspended in their relative positions in space. Their distances apart are determined to scale, their relative brightnesses are indicated by their respective sizes, and the colors of the stars, blue,

OUR NEIGHBOR STARS

Dr. W. S. Adams, director of Mt. Wilson Observatory, inspecting the model of the sun's nearest neighbors at the Carnegie Institution's exhibit.

yellow and red, are shown by the colors of the globes.

The model is most decidedly a packing of much into little. The box in which the display is housed is only about three feet on a side. The assemblage of stars within it occupies a sphere of space with a radius of sixteen light years of the sun. A light year is the distance traversed by a beam of light in one year—and light travels at the velocity of approximately 186,000 miles a second. Calculations show that in this group of forty, there is only one star per 440 cubic light years, and that the average distance between the stars is seven and one-half light years.

Space may be more populous with stars than that, however, since there may be a number that have not yet been observed because of their small size or faintness; and there may also be a number of stars within it whose faint light at present deceives astronomers into thinking they are outside the boundary.

This model was one of the exhibits of the Mount Wilson Observatory, where for many years a program of measuring stellar distances has been in progress.

See Front Cover

Among the exhibits of Mayan pottery from Guatemala was the little figurine shown on the front cover of this week's SCIENCE NEWS LETTER. This figure has the interesting device of a slit in the back of the head letting the light show through the eyes. As you walk past the figure, this spot of light appears to move, thus giving the effect of moving eyes following you.

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PSYCHOLOGY

New Mode of Thought Urged To Replace Aristotle

A DEMAND for a new mode of thinking, that junks our most fundamental laws of thought just as Einstein with relativity disarranged the old-fashioned laws of time and motion, was made to the American Association for the Advancement of Science.

As expounded by Prof. Oliver L. Reiser, University of Pittsburgh philosopher, the new non-Aristotelian method of thought blasts the idea that "a thing is what it is" or that it is identical with itself in all respects. For example, you are not the same you that existed a second ago or a year ago. An apple, or a planet, or a human being is constantly changing with time and it is therefore different second by second. Since the attacked law of identity is the most fundamental of the three traditional laws of thought in the heretofore hallowed logic of Aristotle, this new idea is upsetting.

The new mode of thinking may be more far reaching than even Einstein's ideas. It may, Prof. Reiser suggested, answer the demand for practical readjustments in the social order and it may create a revolution in the very theory of science. It may cure the insane who suffer from delusions. It may in time affect our everyday thinking. It may be the mode of thought of the man in the street.

Not easily won will be these possible revisions. Some look with skepticism upon the new ideas.

Non-Aristotelian logic, as it is called, arose out of the new discoveries in physics, the idea of evolution and mathematics. The pioneers are the Dutch mathematician, L. E. J. Brouwer, the Polish investigators Lukasiewicz and Tarski, Count Alfred Korzybski, and Prof. C. I. Lewis of Harvard. Prof. E. T. Bell, California Institute of Technology mathematician, has espoused the cause, claiming that Aristotle handcuffed human thought. Count Korzybski is its leading expositor.

"It is hoped that this new intellectual revolution," Prof. Reiser said, "will free human thinking from its limitations and remove the underlying causes of mental and social maladjustments. The next big development in the mental evolution of the race is already upon the scene and we will undoubtedly hear much of it in the years to come."

One of Count Korzybski's insistences, as explained by Prof. Reiser, is that all names of objects should be dated or numbered, such as apple number one, apple number two, much as a fond parent labels or dates the photographs of a baby. This is to avoid the fallacy of false identification.

The linking of intellect and emotion is insisted upon by the new thinking. Study of reason or thought independently of emotion is declared just as objectionable as the separation of space and time or mind and body.

It is reported that the Korzybski system has produced encouraging results when used to treat certain types of insanity based upon false identifications or delusions.

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OCEANOGRAPHY

New Current Meter Allows Prediction of Huge Waves

A RECORDING current meter, which will keep a complete record of intensity and direction of ocean currents, and by which scientists hope to be able to forecast destructive waves, has been devised by Dr. George F. McEwen, professor of physical and dynamical oceanography at the Scripps Institution of Oceanography, La Jolla, Calif.

No instrument now in use keeps a time record of current changes, Dr. McEwen stated, in explaining his new machine, now in its experimental stage on the pier at the Institution.

The device, which operates on the principle of a pendulum, consists of a perforated sphere set on gimbals free to move in two directions. The extent of the movement is recorded on a revolving waxed cylinder.

"From the movement thus recorded along two lines at right angles to each other we can easily compute the resultant line, which gives us direction and intensity of the current," Dr. McEwen said.

Dr. McEwen explained that the new instrument is designed to compile data on current movements for use in studying causes of the huge waves which have rocked the coast of Southern California and on occasions caused property damage.

Attached to the apparatus, which weighs 200 pounds in all, is a magnetic needle which automatically locks after becoming settled, so that the compass direction of the currents is known.

The disk on which the record is made is rotated by another cylinder filled with oil and containing a plunger. As the oil seeps by the plunger an attached weight slowly lowers, turns the disk, and locks the compass. Dr. McEwen anticipates constructing a similar device for measuring winds and air currents.

While the present instrument is now recording currents near shore at La Jolla, the scientist hopes soon to equip ships with similar ones.

According to Dr. McEwen, the giant waves in this region are caused by a combination of coastal oscillations and long sloping waves coming in from hundreds of miles out at sea.

"We don't know much about these currents yet," he said, "but once we have these instruments stationed in key positions along the coast we shall be able, at least, to forecast disasters."

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PHYSICS

Emulsions Under Microscope Stage Dramatic Performance

LIFE is not in either water or oil, as such, yet when the two are brought together in the presence of a substance that causes them to mix, or emulsify, they will stage a performance startlingly lifelike in its complexity. One of these vivid, quasi-vital performances by a non-living setup was described by Dr. P. A. Young of Montana State College, before the meeting of the American Association for the Advancement of Science.

Dr. Young used three things: water, petroleum oil, and a go-between or emulsifier known as cresoap. He related his observations:

"Through a microscope I saw a very interesting, rapidly moving drama when water touched petroleum oil containing the cresoap emulsifier. At the instant that they touched, a wall appeared between them. Then suddenly streams of oil flowed through holes in this wall and emulsified clouds of oil globules in the water, like a garden hose spraying drops of water into the air. But not all of the streams of oil formed globules, for some of the oil streams formed large masses that moved in the water, and resembled thunderhead clouds in the sky.

Moved Like a Snake

"The wall between the oil and water sometimes wiggled like a snake and then made knobs that cut off large globules of oil emulsion into the water. These globules were marvelous complex spheres of oil that contained spheres of water, and inside these internal spheres of water were very little spheres of oil that rapidly danced the Brownian movement.

"When the wall between the oil and water did not move, oppositely revolving whirlpools swirled in the oil and water beside the wall, and emulsified the liquids they drove through the wall. Another peculiar current in the oil was a cylinder that rolled as though it were on a spindle beside the wall.

"Breaking of emulsions was spectacular, too. When a granule of salt dropped into the oil emulsion, wiggly solution lines darted out from the salt and attacked the oil globules. These suddenly exploded, ran together, and formed a lake of oil. Then a wall appeared between the oil and the salt water, with oil globules exploding and joining the lake of oil on one side of the wall, while cylindrical currents rolled and pairs of whirlpools swirled on the other side.

"Thus I saw how emulsions form and break, and so I learned more about the emulsions of protoplasm, dairy products, and petroleum."

The study of emulsions is highly important to chemists, physicists, and biologists, and in the practical industries and arts as well, Dr. Young explained. Many of our most important foods are emulsions: milk is an emulsion of fat in a watery fluid; butter an emulsion of watery fluid in fat. The sprays generally used to protect crops and orchards against insect enemies are emulsions. Protoplasm itself, the complex stuff in our cells that is alive, is an exceedingly complex emulsion.

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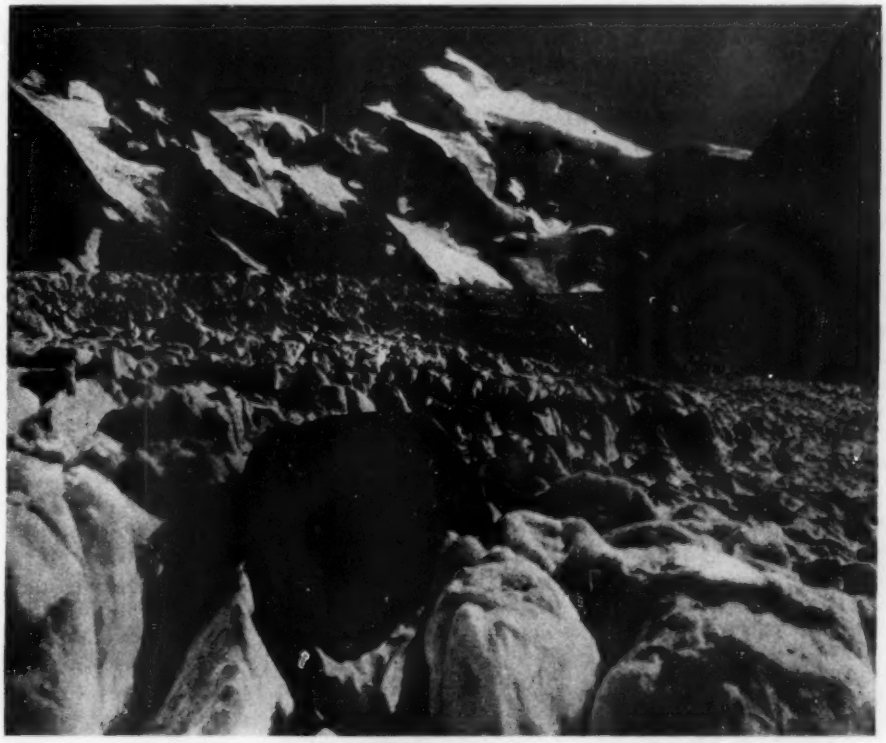
It has been asserted that Leonardo da Vinci was not truly ambidextrous, using either hand indiscriminately, but that he painted with his right hand and drew with the left.



A ROCK GOES RIDING

How some of the huge "erratic" boulders that lie on hillsides in the northern United States were transported on the humps of slowly creeping caravans of ice is strikingly exemplified by a modern instance, photographed by the Washburn Alaskan Expedition of the Institute of Geographical Exploration, Harvard, in 1934, at Crillon Glacier. The great dark mass of the boulder may move only a few feet, or even a few inches, in a year; but glaciers are very patient, and in the end carry their burden many miles.

MEDICINE

New Serum Successful in Treating Undulant Fever

Inoculation with Material Produced From Goats Is New Weapon Against Animal-Borne Disease

TWENTY undulant fever patients quickly restored to health and normal activity by the use of a new serum constitute the proud record reported by a group of Cincinnati medical scientists to the American Society of Tropical Medicine.

The serum was produced from goats after inoculating them with chemically treated suspensions of the organisms that cause the disease. Drs. W. B. Wherry, A. E. O'Neil and Lee Foshay of the University of Cincinnati College of Medicine and the Cincinnati General Hospital are the group responsible for this advance in the fight against undulant fever.

The disease is a serious, long-drawn-out affair which may end fatally. It is caused by an organism known by various names, *Bacterium melitensis* being a correct technical title. Neuralgic pains, swelling of the joints, recurring attacks of fever, weakness and anemia are unpleasant features, and particularly unfortunate for the sufferer is the tendency for the disease to become chronic, with frequent relapses and very slow recovery.

Goats, cows and pigs suffer from the disease, and it is from these animals, particularly from unpasteurized milk of the first two, that man contracts undulant fever. The relation between the animal disease and the human disease and the value of pasteurization of milk as a preventive measure were established by Alice Evans of the U. S. Public Health Service. In the course of her research she herself suffered a severe attack.

Treatment of undulant fever has remained unsatisfactory until the development of the anti-serum by the Cincinnati scientists.

So far the serum has been given to only twenty-six patients, a small number, Dr. Foshay pointed out in his report. But the results in over two-thirds of the cases have been "extremely gratifying" and the lack of success in six cases was partly due, he believes, to the fact that in the first cases the serum used was not strong enough or not given in large enough doses or given too late.

To be successful, it is important that the serum be given before the end of the fourth month of the illness, Dr. Foshay emphasized as a result of experience with these first twenty-six patients. Delay in starting anti-serum treatment was responsible for some of the failures, he said.

In the twenty patients who were benefitted by the serum, the fever stage was reduced from the usual weeks-long period to an average of only nine days. Other symptoms disappeared within from one to six weeks, with an average of fifteen days. The patients were able to resume their customary activities in from eight days to two months, with an average of three weeks. They have been free from relapse for periods ranging from four months to twenty-nine months, or over two years.

The success with this serum has encouraged the scientists to try to produce from the horse a more powerful and reliable anti-serum.

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PSYCHOLOGY

"Brain-Trusters" Are Not Congenitally Superior

IN THIS day of changing social and political systems, it is reassuring to find scientific justification for our American democracy, based as it is on the doctrine that all men are created equal and are therefore entitled to equal shares in the privileges and responsibilities of government.

Speaking before the American Association for the Advancement of Science at Pittsburgh, Dr. David Wechsler, chief psychologist of Bellevue Hospital, New York, made a strong case for democracy.

The doctrine of equality does not mean, and nobody today would insist it to mean, that there are no mental and physical differences, Dr. Wechsler said. No one doubts that some men are physically stronger or have more retentive memories or better mechanical ability than others. But ruling out the obvious defective and the rare genius, the differences between men are too small to affect the average person's capacity to take part in the social and political institutions that govern his daily life.

Dr. Wechsler presented results showing men to be after all pretty nearly equal in a great variety of functions ranging from strength of grip and memory span to polishing spoons and knitting sweaters.

"It is not true," Dr. Wechsler concluded from his tests, "that there is inevitably a small percentage who are congenitally so superior to others as to make them the inevitable rulers of their fellowmen. Furthermore, even if this were the case, there is little evidence to show that the ruling classes are exclusively or even preponderantly composed of such individuals."

He doubts whether the I.Q.'s or mental ages, if obtainable, of the "brain-trusters" in the various governmental departments would turn out to be greater than those of "their less conspicuous predecessors" in similar offices. What distinguishes the "brain-trusters" from their predecessors in office is probably not a difference of native ability but a difference of attitudes toward social problems.

An aristocracy of brains might be as oppressive as an aristocracy of brawn, or even more so, Dr. Wechsler said, pointing out that the mischief produced by dictatorships does not hinge on whether they are autocracies of brain or brawn but on the fact that they are autocracies, that is, forms of government wherein the average man and hence human beings in general are negligible and contemptible entities.

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PHYSICS

New Method Helps Recover Radioactive Materials

SCIENCE has turned junkman and recovered thousands of dollars of valuable radioactive products from which gamma rays, so useful in cancer therapy, may be obtained.

Prof. George B. Pegram and Dr. John R. Dunning of Columbia University reported to the physical section

of the American Association for the Advancement of Science that the heavy ray-producing element polonium had been recovered from old radon tubes obtained from Memorial Hospital in New York City. In one test polonium equivalent to $2,100 was obtained by the new method. Polonium is the radioactive element discovered by the late Madame Curie, who, with her husband, also discovered radium.

The scientific junkman method consists essentially of separating the polonium from impurities by use of electric current in a solution. An every-day use of this electrolytic technique is in the silver plating of metal, like knives, forks and spoons.

Using a variation for the common method adapted by the electrochemist Prof. Colin Fink of Columbia University from earlier techniques, Prof. Pegram and Dr. Dunning employed a rotating electric contact in their polonium-bearing solution.

Revolving at speeds as high as 6,000 revolutions each minute the rim of the electrode moved with velocities up to 36 feet a second.

In a sample extraction test the scientists obtained 35 millicuries of polonium. A millicurie is the unit by which the amount of radioactive materials is measured. A gram of radium, worth $60,000, is equal to 1,000 millicuries. By obtaining 35 millicuries the Columbia investigators recovered polonium worth $2,100.

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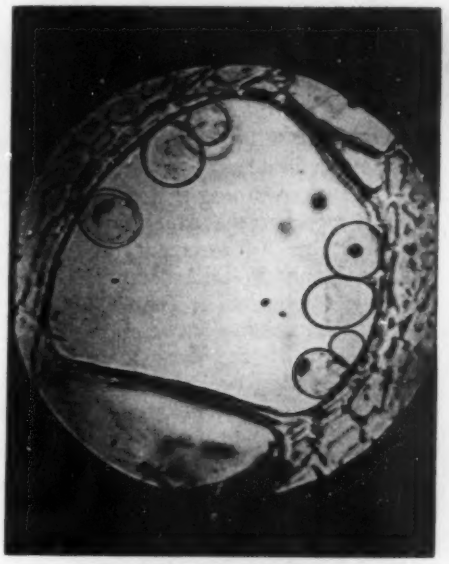

YOUNG TYLOSES

One of the peculiar structures that clog up water ducts in living trees. They are outgrowths from living cells in the wood adjacent to the ducts. Some woods always have them; some have them only in certain circumstances, as when attacked by parasitic fungi. This photograph is remarkable because it shows the protoplasm and nuclei of the cells from which the tyloses have grown.

ANTHROPOLOGY

Human Beings Little Improved Since the Stone Age

HUMAN beings have shown no marked improvement in their evolutionary status since they were mere Stone Age men and cave dwellers, at the end of the last Ice Age.

Furthermore, today, the human species is faced with danger. By its benevolence and its medical and religious ideals, it is protecting and perpetuating the weak and unfit, the very types that nature used to weed out ruthlessly, leaving the fit to survive.

These warning signposts along the road of man's destiny were pointed out by Prof. Ernest A. Hooton, noted anthropologist of Harvard University, speaking before the annual meeting of the Society of the Sigma Xi.

Calling for a "biological new deal," Prof. Hooton said:

Destroy the Public Enemy

"Let us cease to delude ourselves with the belief that education, religion, or other measures of social amelioration can transform base metal into gold. Public enemies must be destroyed—not reformed. We need a biological new deal which will segregate and sterilize the anti-social and the mentally unfit. Intelligent artificial selection should replace natural selection."

The bearing that physique, good or bad, has on culture in being investigated in extensive researches, Prof. Hooton showed. Growth studies of school children show that the physically fit child is apt to be the superior student. On the other side of the ledger, mental defectives are commonly associated with subnormal physique. The criminal also is under par physically.

Physically Inferior

"Charles Goring conclusively demonstrated that English criminals, as a group, are vastly inferior in physical development to the law-abiding population," said the anthropologist. "My own weary researches upon the American criminal in ten states are even more decisive. While the complete results cannot yet be divulged to a none-too-impatiently waiting public, it can be stated positively that the biological inferiority of the criminal is no less marked than his economic ineffectiveness and his general stupidity."

In his plea for better human stock, the anthropologist said:

"We all admit that our social engine has stalled, and a succession of political, economic, and sociological drivers have been pulling and pushing every movable gadget in a futile effort to make it start. May not a biological bystander suggest the possibility that some one has watered the gasoline?"

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PSYCHOLOGY

Psychologist Tells How To Prolong Mental Life

OLD AGE as well as extreme youth is being put through its mental paces by the psychologists. Prof. Walter R. Miles of Yale reported to the American Association for the Advancement of Science that although mental ability goes down hill steadily with old age, if you keep practicing your skills you will probably be able to excel the younger generation. For instance in trapshooting, while those 40 to 44 years of age do better than those 50 to 54, young shooters aged 10 to 19 do far worse than either group. In other skilled activities also the psychological elements of skill, practice and experience have a counterbalancing effect on the inevitable psychological ravages of age.

Prof. Miles suggested that longevity serves as a sort of mental test because he finds that the great men of all ages have lived long lives. Those who are listed in Who's Who, for instance, have longer life spans than the ordinary run of mortals.

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PSYCHOLOGY

Relying on Snap Judgments Leads to Depressions

DON'T trust too much to your first impressions!

This is the warning that can be taken from a report to the American Association for the Advancement of Science by Dr. Henry F. Dickenson, Hiwassee College, Madisonville, Tenn.

"First impression answers are too often laden with the dangers of superficial knowledge, prejudices, biases, misinformations, misconceptions, propaganda, and even hearsay," Dr. Dickenson said.

"Advertising agencies know and utilize well these human weaknesses. Comparatively few advertisements would stand up under the discriminating analysis of the intelligent consumer. Contemporary society suffers greatly at the hands of an unthinking group which holds the balance of power.

"Unanalytical thinking or snap judgments are largely responsible for "Bonanza Oil Booms," "Wall Street Crashes," "Florida Booms," lynchings, depressions, and the like, he said.

Intelligence tests given to 1450 college students revealed that although few took second thought and made corrections in their answers, still these corrections boosted their scores to an amount totaling for the group 625 intelligence quotient points, which is equivalent to the intelligence possessed by four geniuses.

Science News Letter, January 12, 1935

METEOROLOGY

Rare Blue Moon Seen In California

A BLUE moon, appearing through a bank of rose-colored clouds, was observed at Santa Barbara, Calif., by Perez Simmons, entomologist, of Fresno.

Scientific basis for the traditional rareness of blue moons appears in Mr. Simmons' report of his observation (*Science*, Dec. 28).

"A search for records of this phenomenon indicates that it is rare and worth recording," he states.

A blue moon was seen on Dec. 10, 1883, and another was seen in Ireland in 1927 during a total eclipse of the sun. Other moons of unusual colors, such as blue and green, have been seen after certain violent volcanic explosions and also occasionally through smoke-laden fogs. Mr. Simmons saw this latest blue moon on Sept. 15. Four witnesses whom he called agreed that it really was blue.

Mr. Simmons describes his observation as follows:

"The stage of the moon was about the end of the first quarter. At 6:15 p. m. about eight minutes after sunset, the moon was plainly visible through a bank of thin rose-colored clouds, apparently cirro-cumulus. Around the cloud bank the brightly-illuminated western sky was a brilliant deep blue.

"Two weeks later an attempt was made to remember the colors and to find their designations in Ridgway. The results of this belated comparison are that the sky was spectrum blue; the cloud bank, begonia rose; the moon, sky blue."

Blue and green suns have also been observed, Mr. Simmons points out. No satisfactory explanation of the colors has been advanced.

Science News Letter, January 12, 1935

OCEANOGRAPHY

Seismic Soundings Reveal Antarctic Ice Thickness

THICKNESS of the Antarctic ice crust that blankets the world's southernmost land is being successfully detected by seismic soundings says a radio report from Little America from the Byrd Antarctic Expedition to the National Research Council.

Thomas C. Poulter, professor of physics at Iowa Wesleyan College and senior scientist of the expedition, reports good results with the scientific work in the Antarctic, and says "we shall soon be starting back in possession of most of the data we set out to get."

Unforeseen difficulties caused a few scientific projects to be abandoned, says the dispatch, but others have assumed much greater proportions than was anticipated.

Regarding thickness of the ice, a point of great scientific interest, Prof. Poulter radios:

"I am pleased to report that the seismic soundings are coming along nicely, and that we have to date about three hundred fifty soundings distributed over eighty stations. The method is proving very satisfactory and giving the ice thickness, whether it is floated or grounded, and if floating, the thickness of the water layer, as well as something of the stratification of the underlying rock."

Science News Letter, January 12, 1935

IN SCIEN

SEISMOLOGY

Three Earthquakes Usher In the New Year

AS THOUGH it were celebrating the beginning of the New Year, the earth's crust treated itself to three violent dances on the first three days of New Year's week.

Two of these, on Dec. 20 and 31, were located in lower California, the part of Mexico south of U. S. California. Sunday's quake was less severe and closer to the border, only about a hundred miles southward, while the New Year's Eve quake was about 150 miles southward from the border and was quite severe.

On New Year's Day there was a submarine quake centered in the Pacific in an easterly direction from the Fiji Islands and about 270 miles southwest of Apia, Samoa. The epicenter was determined by the U. S. Coast and Geodetic Survey based on seismological reports to Science Service from St. Louis University and Manila as 17 degrees south latitude and 174 degrees west longitude. The time was 8:20.9 a. m., E.S.T. Jan. 1.

Science News Letter, January 12, 1935

MEDICINE

Virus of Typhus Fever Grows in Rat Flea's Body

RAT fleas spread typhus fever in America, but they are not mere mechanical carriers. The virus of the disease multiplies in the body of the flea, Dr. R. E. Dyer, of the U. S. Public Health Service's National Institute of Health, reported to the meeting of the American Association for the Advancement of Science.

The investigation which disclosed how typhus fever is spread in this country has been carried on over a period of years by the federal health service. During the course of the investigations, which Dr. Dyer described, a number of the men working on the problem contracted the disease.

Science News Letter, January 12, 1935

...E FIELDS

PLANT PATHOLOGY

Man Gains in Fight On Wheat Rust

MAN, aided by the elements, seems to be gaining on at least one front of his wide war against innumerable plant disease fungi. Black stem rust of wheat and other grains, one of the costliest of all plant diseases in terms of destruction wrought to growing food, has been decreasing in severity during the past 15 years, Drs. M. N. Levine and E. C. Stakman, of the U. S. Department of Agriculture, told the American Phytopathological Society.

Black stem rust is a fungus that thrives best in at least moderately moist weather, so that the past several years of drought which the grain belt has experienced may have had something to do with the improved situation. However, Dr. Levine pointed out, the severity of the disease has been less even in seasons favorable for its spread. It would seem only fair, therefore, to credit some share in the improvement to man's own efforts, first in eradicating some 20 million barberry bushes, carriers of the disease, and second in breeding new, rust-resistant strains of wheat, oats and other grains.

Science News Letter, January 12, 1935

PSYCHOLOGY

Just As Many "Geniuses" Among Girls As Boys

THE popular belief that men are mentally superior to women, and that the number of "geniuses" or the extremely intelligent is greater among boys than among girls, was dispelled by a report by Prof. Paul A. Witty director of the psycho-educational clinic at Northwestern University, speaking before the American Association for the Advancement of Science.

The popular misconception has been given support, Prof. Witty pointed out, by observation of the outstanding proportional achievement of men in music, art, science, and literature, and also by studies that have been previously made of small numbers of gifted children. It fails, however, when large numbers of boys and girls are studied with the unprejudiced eye of scientific mental measurement.

Altogether, 14,149 boys and 13,493 girls were included in Prof. Witty's study. These were all students in secondary schools.

The ratio of gifted boys to gifted girls is not 2 to 1, as has been previously claimed, but is almost exactly 1 to 1, Prof. Witty found.

The average intelligence for each of the four classes in the secondary school, is practically the same, and is just a little above what is considered the average for the entire population. Evidently the less intelligent as well as the gifted survive equally well in the educational race through the high school.

From all these thousands of boys and girls, however, only 47 boys and 48 girls were found to have intelligence quotients (mental age compared with chronological age) of 140 and above, thus falling in the group of "geniuses." A much larger number,—250 boys and 244 girls—have IQ's between 130 and 139.

Science News Letter, January 12, 1935

ANTHROPOLOGY

Will Search for Traces Of Ancient Man in Oregon

THOROUGH search for traces of prehistoric man is to be made near Benham Falls, in the Deschuttes section of Oregon, says Dr. L. S. Cressman, professor of anthropology at the University of Oregon.

A grant of funds for this purpose has been made by the Carnegie Corporation to the University, and work will begin as soon as snow has melted from the ground, in the spring.

Clues indicating that some of America's earliest settlers may have passed that way were discovered recently, when workmen digging at an irrigation dam project found three objects, apparently tools, buried in a hard gravel layer. The gravel lay several feet below the volcanic topsoil which has covered the region for centuries.

Dr. Cressman and other scientists from the university came to investigate the site and advocated further exploration. Age of the ancient tools, according to preliminary calculations by Dr. Warren D. Smith, geologist, may be 10,000 years.

Science News Letter, January 12, 1935

PSYCHOLOGY

Cure Your Scares By Repeating Experience

A SCIENTIFIC basis for the aviator's tradition that he must fly immediately after "cracking up" if he is to keep his nerve has been found in experiments conducted at the Harvard Psychological laboratories.

The best way to conquer fear, according to Dr. Carl E. Smith, is for the person frightened to place himself immediately under the same conditions which produced the original scare and see for himself that nothing happens.

He stresses the need for undergoing these same conditions as soon as possible, for a delay of even 24 hours tends to fix the fright permanently, and gives increased fright when the conditions are encountered again. Prompt repetition of the original conditions, however, causes considerably less anxiety and the fear can usually be eradicated within a short time.

In this research on the mental reactions accompanying fear, Dr. Smith found that the electrical resistance of the skin of a subject was noticeably changed when the subject was afraid. This discovery correlates with the principle which resulted in the construction of one type of the so-called "lie-detector."

Attaching his subjects to a delicate instrument to measure this change in the resistance of the skin, Dr. Smith prepared to frighten them under a definite set of conditions and then re-establish these conditions to measure the fear.

A list of words was read and the subject given a small, but unpleasant electrical shock at the word "cat." Half of the subjects were dismissed for 24 hours, while the other half were forced at once to go through the experiment a second time.

In this repetition the same list of words was read, but no shock given, although all other conditions were maintained the same. Those taking the tests immediately showed mild anxiety at the mention of the key-word "cat," and although a few showed fear, the phobia passed quickly in most cases.

Those returning 24 hours later exhibited considerable fear throughout the experiment, and although reassured that the shock would not be repeated, the fear remained strongly fixed.

Science News Letter, January 12, 1935

PSYCHOLOGY

Can You Pick Out the Murderer?

Not From His Looks, is the Scientific Answer; But His Personality Differs From Those of Other Men

By JANE STAFFORD

YOU cannot tell a murderer by his looks. But there is a definite "murderer type" of personality.

Consider the faces of Clara Phillips and Winnie Ruth Judd, of Gerald Chapman, John Dillinger, Richard Loeb, and Guiseppe Zangara. They were all convicted of murder but there is nothing about their looks that would make you class them as murderers. Nor would you even classify their faces, with the possible exception of the foreign-born Zangara, as all belonging to one type or being different from the men and women you see in shops and on the streets or meet at the bridge table or sit next to at a show.

Psychiatric studies, however, are bringing to light facts about the personalities of murderers that show how they are different from other criminals as well as from law-abiding persons. Furthermore, these studies show that the personality of the murderer governs not only the actual crime but the manner of doing it and the choice of weapon.

The personality, in the psychiatric sense, is such an important factor leading to homicide that scientific knowledge of the murderer type will, it is believed, aid in apprehending the criminal, in preventing further offenses by indicating which criminals may be re-educated and safely paroled, and finally may prevent executing or sending to prison an innocent person.

Emotional Instability

Emotional instability is the prime feature of the murderer personality, Dr. John A. Larson of Chicago's Institute for Juvenile Research found. Dr. Larson has made a study of murderers in the Illinois correctional institutions and elsewhere and recently reported some of his findings to the American Psychiatric Association.

His study took into account all the facts about the physical, psychological, sociological and psychiatric status of the prisoners incarcerated for manslaughter, murder and assault to kill. In addition he had information on their behavior while in jail and while on parole. He checked his findings by repeated examinations. On the basis of this knowledge of the prisoner, prediction was made as to what he would do when released on parole and these predictions—the prognoses, the doctor calls them—were carefully checked with observations of the paroled person's actual behavior.

The trait of emotional instability was found nearly four times as often in the murderer group as in the general prison population, Dr. Larson reported. The actual figures showed that 38.9 per cent., nearly four-tenths, of prisoners in jail for manslaughter, murder and assault to kill were emotionally unstable, whereas only 12 per cent., a little over one-tenth, of the general prison population belonged in this class. More abnormalities of personality were found in the homicidal group than in any other groups of offenders save the sex offenders.

Outbursts From Birth

"Many of the first offenders present the picture of an emotional instability characteristic of temper tantrums and explosive outbursts from birth," Dr. Larson said.

It is in this very group that there seems to be the best chance for re-education and Dr. Larson thinks that psychiatric treatment should be given such prisoners. In this group, the killing appears as an isolated offense. The prisoners may have had temper tantrums in childhood, but their misbehavior had never reached criminality before. Consequently Dr. Larson thinks that the outlook is good for their being law-abiding in the future. He pointed out that these findings in this respect are similar to those of Warden Lewis E. Lawes of Sing Sing.

The latter recently described one group of homicides as being white foreign born Italians, U. S. born Negroes, or U. S. born of Irish stock; from 27 to 31 years old; comparatively illiterate; unstable and with the kind of mind that makes the person have delusions, generally of persecution; normal physically; good workers; and first offenders.

This description or classification is practically applicable to the group studied in the Illinois correctional institutions, Dr. Larson said. Here, too, most of the first offenders were good workers and with a few exceptions had good health.

A significant number of the murderers suffered from mental diseases; approximately a third of the prisoners suffering acute mental disorder were found in the murderer group. About 65 per cent. of the acute mental disease found occurred in the group of first offender murderers and accidental offenders.

Mental Deficiency Next

Next to emotional instability and mental disease, mental deficiency seemed to be an outstanding trait of the murderers.

"In this group, only a very few with superior intelligence by formal rating and social adjustment were found, in marked contrast to the group of embezzlers, confidence men, etc.," Dr. Larson stated. "Here there seem to be more mental defectives than in any other group excepting sex assaults."

In checking the group on the borderline of normal mentality, Dr. Larson found there were nearly as many such borderline individuals as ones with average intellectual equipment. This, he believes, may, with the exception of the foreign-born, account for another fact he learned, that the murderers had gone to school very little.

Distinctly more of the individuals in the murderer group had no education or their schooling was limited to the first four grades. There was also a significant difference between murderers and other prisoners in the percentage having high school or college educations.

Complications Cause Risk

Mental deficiency in itself is not a risk so far as the possibility of the person with below average mentality committing murder is concerned, Dr. Larson explained. But when the mental defective is also suffering from alcoholism or syphilis or both, then he must be considered a serious risk, whether or not he has other traits of the murderer's personality.

Youth was another characteristic of the murderer group that Dr. Larson found in his study, but this, he pointed out, might be due to the fact that in spite of their youth murderers are committed to the penitentiary instead of to the reformatory.

The murderer type, then, is characterized by emotional instability, below average mentality, mental disease, lack of education and youth.

Dr. Larson's study revealed many other interesting, significant facts about murderers and how and why they commit their crimes, facts which add details to the picture of the murderer personality.

Isolated Offense

Murder is a single, isolated offense in the lives of most individuals. More than 60 out of every 100 murderers had never been arrested before.

More of the group of average intelligence seemed to be motivated by gain while those of the lower levels of mentality seemed actuated by instinctive drives, especially sex. In the latter group, perhaps because of less inhibitory powers, there were more explosive attacks.

"The choice of weapon and the actual manner of killing varies with the type of offense," Dr. Larson said. "The gun, knife and club were the most common, since most of the crimes were the result of explosive outbursts, but even in premeditated crimes the gun and knife represent the most convenient.

"The silencer, so often met with in fiction, actually was not used in any cases, and according to firearms experts is not practical.

"Poison seems to be more associated with women.

"In the relatively few cases on record the use of chloroform or ether in cases of homicide is usually limited to physicians."

Concealment Shows Motive

Dr. Larson's study also took into account the motives of the different crimes. Interesting information both on the subject of motivation and on the personality of the killer was gleaned from knowledge of how he disposed of the body and attempted to conceal the crime, Dr. Larson said.

In the case of murder following fights and in many killings associated with gang warfare or in cases when the murderer had some mental disease, an attempt was made to conceal the crime. In crime associated with gain there is apt to be careful planning and execution and some attempt to make the crime offer a clue to persons other than the actual murderer or to make it appear a suicide. These very attempts, however, or some other little act will indicate the identity of the offender, Dr. Larson found.

Persons afflicted with premature old age or those with arteriosclerosis—hardening of the arteries to you—will often commit serious blunders due to their faulty judgment, Dr. Larson said.

Thus, the murderer of this type may, after getting his victim insured, shoot him in a way meant to simulate suicide and at the same time use a chloroform mask. But perhaps the bullets do not remain in the body as planned, but leave a wound of exit with hemorrhage. This is carefully mopped up and the body wrapped with tender care. Later, abandoning the idea of making the murder look like suicide, the criminal attempts to fasten the blame on possible burglars. But his various blunders give the police a clue, and they also give a clue to the psychiatrist, who can tell the police to look for a certain type of murderer, one suffering with arteriosclerosis or some other condition apt to impair his judgment.

Occupation a Clue

The occupation of the killer, perhaps not strictly part of his personality, nevertheless often furnishes a clue to the finding of the body. As examples, Dr. Larson pointed out the case of the Chicago sausage maker who tired of his wife and treated her body with caustic chemicals in the vat used in his business. Unfortunately for himself, a ring and a piece of bone were left undestroyed by the chemicals. Other examples he mentioned were the contractor who, also tiring of his wife, buried her head in a block of concrete; and the famous Paris catacombs case where the fertilizer for the underground-grown mushrooms was secured from the bodies of the dead. All went well here too, until a murder victim was ground up for fertilizer and some jewelry was left over.

Because of the importance of the murderer's personality both as a means of apprehending him and of telling whether or not he can be re-educated and safely paroled, Dr. Larson suggests that clues to his personality be gathered according to a definite modus operandi similar to the ones already employed by the police to get clues to the killer's identity. He described this method as follows:

PLEASANT LOOKING

Yet this young man, Martin J. Durkin, is now in prison for the murder of a Federal agent.

"The modus operandi, or a technical tool used in criminological investigation can be elaborated upon and modified to describe these offenders as well as the crime, and where necessary assist in the evaluation of the innocence or guilt of the alleged offenders, and also in prognosis. Whenever possible as accurate data should be secured as is scientifically available.

"This would mean, ideally then, that one cannot, as is often done, assume that the inmate is guilty because of a court conviction, since it is known that because of many factors men innocent of any crime, especially in this group, are found in prison."

Aid From Modus Operandi

"Aside from deception tests, practically never made use of officially in prison work, the modus operandi technique, properly utilized, could be of much service. The more scientific investigators make use of this method routinely in criminal investigation. This, in the analysis of the crime, is what the interview, so-termed factors, attitudes, and history are to the psychiatrist, analyst, sociologist or psychologist. Although usually made use of in the search for an unknown offender, because of personality traces left at the scene of the crime, interesting leads as to personality factors of the individual, subsequently identified, may be secured.

"Often the analysis of the modus

operandi secured from the scene of the crime may not agree with the personality of the one convicted who is subsequently proved innocent. In the majority of manslaughter and homicide cases the offender often claims self defense.

"Briefly, the so-called modus operandi described in the monograph form by Atcherly, an English constable, and later perfected by Vollmer and statisticians, refers to a minute description and classification at the scene of the crime, and is based upon the assumption that the offender leaves traces of his personality behind. These 'clues' are significant and even no 'clue' is equally significant. Many officers speak of offenders who commit any type of crime and change from time to time. All offenders, and especially recidivists, leave telltale traces behind."

Dr. Larson cited his own experience in one case to show how this method actually works out.

"As an intermediate case-working chief investigator a few years ago, for many weeks the writer and his police colleagues were trying to locate a gang of auto thieves who combined joy-riding with drinking, with hold-ups, rape, and shooting scrapes with police officers. By the use of maps, plotting times of attack with places where the stolen cars and other evidence were recovered, it became possible to predict so that traps could be laid.

"Only through the carelessness and poor cooperation and intimidation of witnesses did these fail, although the identity of the offenders had been accurately established. After a frustrated hold-up and wounding of one of the gang in a duel with an officer, the crimes were temporarily stopped with the final arrest of the gangsters.

"In the study of the crime in cases of homicide, the manner of death, place, circumstances, apparent motives, secured objectively tell us much about the type of individual to look for, and this, coupled with all of the factors of a subsequent psychological analysis give much interesting data.

"The killing of jealousy, or in the heat of passion, fever of revenge or drinking, or due to delusions of persecution, differ from the mass murders, such as lynchings, sadistic or other sex crimes, from the 'ride' of the gangsters, to the killing of the squealer or stool pigeon found with a nickel in his hand or his lips sewed together, or torch killing, or the gangster 'spotting' of the victim to the cult murder and those of strikes, etc. No one factor in the personality integration is important alone, but each differs in every case depending upon the relative stability or extent of organization."

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Science News Letter, January 12, 1935

SOCIOLOGY

Sterilization Wrong Approach To Feebleminded Problem

STERILIZATION will not solve the problem of mental deficiency on either economic, eugenic or humanitarian grounds, in the opinion of Dr. Lionel S. Penrose, research medical officer of the Royal Eastern Counties Institution at Colchester, England.

The menace of the feeble-minded is a question of very moderate dimensions when put in its true proportion to other problems, Dr. Penrose points out in his recently-published book, *Mental Defect* (Farrar & Rinehart).

On the economic side, Dr. Penrose states that it might cost the state as much as four million pounds to provide institutional care for all the mentally defective in England who need it. But it would be possible to cope with the whole problem of mental deficiency in that country by a comparatively small reduction in the hundred million pounds or so spent annually on the fighting forces.

Only 5 per cent. of the next generation of mentally defective persons would be prevented if all existing mentally defective parents were compulsorily sterilized, Dr. Penrose says.

"Furthermore, a large proportion of existing defectives never could have children because their mentality is of such low grade that they would never, in the ordinary way, find a mate," he states.

The only defectives whom it would be worth while sterilizing are those of high enough mentality and complete enough physique to enable them to have offspring. But even these defectives can not, under present economic conditions, earn their own living. Sooner or later they drift into institutions and they would do so whether sterilized or not.

Of the slightly higher grade of defectives, those having a mental age of nine years or more, there is the serious difficulty of determining whether they are or are not defective. Many authorities consider this mental age the borderline. Undoubtedly these persons make poor parents, but even here the problem is solved by itself without recourse to sterilization, Dr. Penrose indicates. These persons generally come to the attention of the authorities because of behavior difficulty and as soon as they are thus discovered, they are put under institutional care.

Finally, Dr. Penrose questions the humanitarian views of those who advocate sterilization of mental defectives.

"At the back of the minds of many people is the notion that sterilization should be a punitive measure," he declares.

"It has been pointed out that the advocates of sterilization never wish it to be applied to their own class, but always to someone else.

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ETHNOLOGY

Snowshoes Not Indian; Originated in Asia

SNOWSHOES, commonly thought of as an Indian invention, really originated in Asia, Dr. D. S. Davidson, anthropologist at the University of Pennsylvania, told the American Anthropological Association at its meeting in Pittsburgh.

The archancestral Asiatic snowshoes, however, were pretty crude affairs, Dr. Davidson explained. They were of an awkward, round, "bearpaw" pattern, with irregular and unsystematic lacing. The highly evolved types used by the Indians, and now a favorite implement of winter sport, were evolved in North America, while the ski, originally a crude plank, was being refined and shaped on the other side of the ocean.

Lately, Dr. Davidson stated, there has been a new migration of the snowshoe, this time westward into Asia again. The natives on the other side of the Bering Sea have learned the use of the highly evolved snowshoe from the North American tribes.

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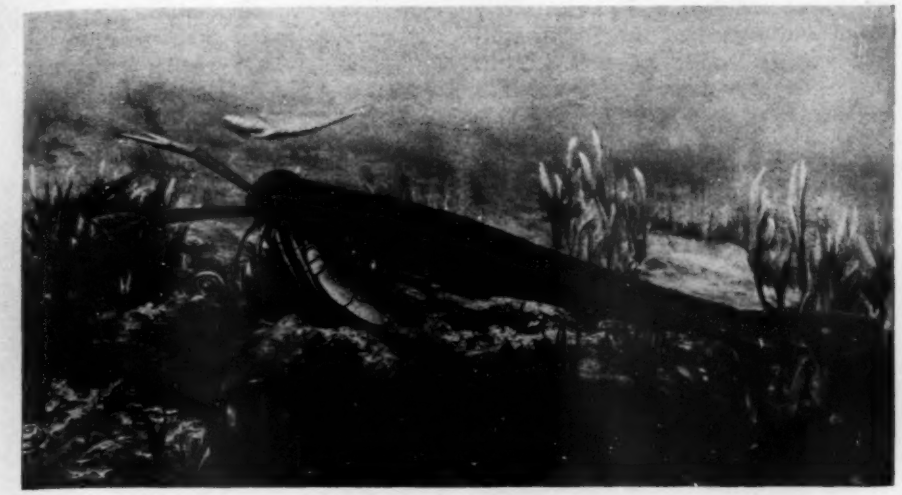

SILURIAN EURYPTERID

This strange creature was an inhabitant of the seas in which the cement beds at Buffalo were laid down, and Buffalo is practically the only locality where good Eurypterids are found. The photograph is of a painting in the Buffalo Museum of Science.

ASTRONOMY

Other Planets Tell About Earth's Past and Future

WOULD you like to know what the world was like a billion years ago and what it may be like a billion years hence? Just look at two of the earth's near neighbors—Mars and Venus. In Mars scientists see the earth as it may eventually become. And in Venus they see a world like the earth may have been before life evolved upon it.

Speaking as retiring president of the American Association for the Advancement of Science Henry Norris Russell, distinguished Princeton astronomer, recently told what science now knows about the atmospheres of the planets. Atmosphere is essential for any consideration of life as it exists on earth.

All planets lose the original vapors, Prof. Russell pointed out, which make up their atmosphere. How soon they lose them depends on how large they are; how well the pull of gravity will keep the gases from flying off into space and becoming lost.

At one end of the scale are the small planets, Mercury and Mars, which have almost no atmosphere. At the other are the giant planets, Jupiter, Neptune and Uranus, so large that they retain even the lightest gases, helium and hydrogen, in their atmosphere.

Intermediate are the middle-sized planets, earth and Venus, which have lost some of their original atmosphere but have kept plenty also.

On the earth at least, important gases, such as oxygen, can be lost in other ways than by merely flying off into space. The chemical process of oxidation goes on and oxygen is going into chemical compounds from which it can be liberated only with difficulty. The formation of iron oxide, or rust, is a familiar example.

Through one way or another, Prof. Russell pointed out, the earth has lost over half of its original oxygen in the last billion years. Plants continually supply oxygen, through their use of carbon dioxide, but gradually and irreplaceably the irons and other elements in the earth turn life-giving oxygen into compounds hard to use in any convenient form.

On Mars, Prof. Russell suggested, this process has gone much further. The actual reddish color of the planet, unique among all heavenly bodies, may be due to the presence of vast plains of reddish iron oxide, or rust, on its surface.

If man lives on Mars (Prof. Russell said only "if" and not "does") he would have to dwell in great cities clustered about enormous oxygen-producing plants making the life-giving gas from rocks and iron oxide. Sealed rooms supplied with oxygen would be a necessity, and ordinary business outside buildings carried on with gas masks and the like.

All this is hardly a pleasant picture but life on the earth may some day be like that.

"Venus seems to be at the beginning of this oxygen shortage process," Prof. Russell said. "It is much as a lifeless earth might be. We do not know how life began here, but conditions may well have been much less favorable on Venus. The real puzzle is the apparent absence of water on Venus' surface. She is almost the twin of the earth in size, density, mass and so on and one might expect an ocean there of comparable volume."

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PSYCHOLOGY

Proper Schooling Raises Intelligence of Children

THE intelligence of your child may be raised to a higher level in a few years of schooling if the school to which he is sent is like the one that Prof. Beth L. Wellman of the Iowa Child Welfare Research Station reported to the American Association for the Advancement of Science.

Contrary to the general idea, the IQ does not seem to be fixed once and for all. Good teaching, strenuous competition and other advanced educational

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methods are capable of bringing out the best in the child. Prof. Wellman's results show that this tends to shoot the intelligence quotients as measured by the famous Binet tests up as much as 28 points in five years for below-average children. Gains were progressively less for brighter children and of course the few real geniuses were not benefited at all.

Working with the nursery school tots that started in their school life at the very mature ages of two and three at the State University of Iowa, Prof. Wellman retested for IQ the children who stayed in the university's elementary school and compared them with children who had gone to other schools. The remarkable gains in IQ were thus discovered.

"The school can be the dominant force in charting the course of intellectual development," Prof. Wellman told the scientists, "superseding whatever influences the home and other agencies may exert. Gains in intelligence are contingent upon the type of school in which the children are enrolled."

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PHYSICS

Plans New Cosmic Ray Studies For Stratosphere Flights

COSMIC rays will be coaxed to confide new secrets next spring, when the Army Air Corps-National Geographic Society stratosphere balloon again takes to the never-clouded upper reaches of the earth's atmosphere. At the annual exhibit of the American Association for the Advancement of Science in Pittsburgh, Dr. W. F. G. Swann of the Bartol Research Foundation told Science Service of some of his plans for apparatus to be carried on the flight.

The heart of the setup will be a new group of Geiger counters, similar to the group carried on last summer's flight by Dr. and Mrs. Jean Piccard, but incorporating certain improvements. The Piccard flight instruments, now historic, are part of the exhibit of the Bartol Research Foundation.

Geiger counters are exceedingly sensitive electrical devices which register an electric "kick" when a ray or charged particle strikes a fine wire inside. If two of them are placed in line, and both of them register simultaneous "kicks," it means that the same ray or particle has hit both wires, thus indicating that it came from the direction in which the two counters are aligned. The set-up for cosmic ray study consists of several such pairs, each pair aligned in a different direction, to catch rays from as many angles as possible.

Dr. Swann stated that he is also considering sending up a "cloud chamber," coupled with his counter apparatus. A cloud chamber is a device that makes visible the path of a charged particle by means of a fog trail of condensed water particles, which can be photographically recorded. As a matter of economy in film, Dr. Swann said that this cloud chamber would be hooked up to the counter group by suitable amplification, so that an exposure would be made only when the counters registered a "kick."

X-rays, with their delicate but remorselessly searching fingers, are every day probing more intimately into the secrets of how atoms come together to make molecules, yielding information of high value as "pure" science and at the same time throwing light on practical questions.

At the exhibit of the Bartol Research Foundation at the meeting of the American Association for the Advancement of Science, was an X-ray camera which takes series of pictures by means of tiny beams of X-rays shot through crystals of various substances. Crystals look solid, but are really full of sub-microscopic holes, and the X-rays passing into those holes are bounced against the more solid stuff along their sides. The way they bounce out again—"diffraction," the physicists call it—when properly interpreted tells of the structure of molecules.

Thus, the Bartol Foundation scientists in charge of the exhibit have shown how the atoms in a molecule of one of the asbestos minerals link themselves to each other in small groups, like a row of children playing "crack-the-whip." This explains the valuable fibrous or "stringy" structure of the fireproof mineral.

Another crystal which has been photographed by X-ray is a complex arrangement of cobalt and oxygen. The X-ray analysis shows holes passing through it from one side to another, like openings in a sponge. Into these exceedingly minute pores liquids and gases can be adsorbed, made to associate closely with other substances, and come out as valuable products of commerce.

Science News Letter, January 12, 1935

GENETICS

New Evening Primrose Variety Never Opens

A NEW variety of the evening primrose, which develops full-sized buds but never opens them, has been found this year among the experimental plants of Dr. George H. Shull, professor of genetics and botany at Princeton University.

So far as is known this variety has never appeared before, although modern geneticists have planted well over a million evening primroses during the last thirty years. It appeared this year out of a clear sky because of a gene mutation, or fundamental change in hereditary make-up, and has been named *Oenothera*, mutant *clusa*.

Science News Letter, January 12, 1935

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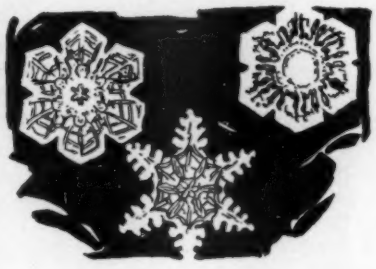
METEOROLOGY

NATURE RAMBLINGS

by Frank Thone



Fragile Individualism

SNOWFLAKES by billions of billions fall each year, yet no two have ever been found exactly alike.

Of a fragility and perishability celebrated since Villon's time (and long before it, too), snowflakes are no less individualistic than the most rugged, hardboiled member of human society who goes round bragging that he is not as other men, but a genus all to himself—for which his hearers no doubt often give thanks, though they may say nothing.

The human comparison is not so inapt, at that; for like the human race or any other generic subdivision of the material world, snowflakes have basic unifying similarities under their distinctive differences. We humans are all made of the same chemical complexes; snowflakes are all crystallized water. Every normal one of us has two arms, two legs, one head, and so on; every snowflake is a six-sided crystal. There are twin snowflakes — Siamese-twin snowflakes with connecting links between them—just as there are human twins. Yet if you examine the very closely similar tiny hexagons of ice at the opposite ends of a "dumb-bell" snowflake, you will find at least microscopic variations between them, just as you will find slight differences between "identical" human twins.

The analogy might be pursued even further. There are "races" of snowflakes, just as there are races of human beings. Some are of a Spartan severity in outline, simple six-sided figures, or unbranched six-pointed stars. Others have a veritable rococo wealth of lacy, feathery, sub-branching little spars of crystal standing out from their six principal shafts. And there are intermediate forms.

Just as races of men are as a rule native to separate and particular regions of the earth, so are these "races" of snowflakes native to particular regions of the air. The straight-sided little flakes are born of the higher clouds, where the cold is severe and living conditions for crystals doubtless harder. Thus they are naturally the Puritans among their kind. The graceful, more ornamental flakes are the offspring of the lower clouds, where the temperatures and other conditions are not so forbidding of artistic beauty. They are, so to speak, the natural citizens of a cloudland Province.

It is a fascinating outdoor sport, easily practiced, to carry a tolerably strong hand-lens on days when dry, unmatted snow is falling, and to stop occasionally to examine the flakes that light on your coatsleeve.

There is only one condition attached, like the "but you must not" of a fairy-godmother tale. You must not breathe while you are studying snowflakes. To them you are a Fiery Dragon.

Science News Letter, January 12, 1935

ETHNOLOGY

Cowboy and Indian Folksongs Tell of Southwest Culture

THE cowboy singing "Home on the Range," the Spanish peasant relaxing against an a e wall strumming lazily on a guitar and humming "Rancho Grande," and the Indian appealing in song to the spirit of the mountain, though of different racial heritage, show a common close contact with nature and unite in giving scientists an impression of the culture of the Southwest.

The history of the development of these haunting songs was described to the American Association for the Advancement of Science by Prof. A. L. Campa, of the University of New Mexico.

Nature is the inspiration for most of these songs, Prof. Campa indicated. The cowboy yearns "for the land where the buffalo roam, where the deer and the antelope play," for the lone prairies, the coyote's howl, and the footfalls of his trusty horse. And in the Spanish song, the desert, the cactus are all important.

In the South, life is easier, more languid. There it is "Carry me back to old Virginia," and "My old Kentucky Home." In the West, it is "Home on the Range." In the Spanish tropics, it is "weeping willows," "soft breezes that blow," and "gliding canoes along peaceful waters."

But to the north, in the arid deserts and bare canyons, it is the "corrido," the ballad that tells of death, long horseback rides, flying bullets, and desert cactus.

Educated man becomes uniform, standardized, artificial, hedged in by conventions, and forever conscious of those around him; he reflects the personality of others rather than his own, Prof. Campa pointed out.

Men in isolated communities reflect nature. They are different because they are themselves.

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●RADIO

Tuesday, January 15, 4:30 p. m.

WHAT COSMIC RAYS TELL US, by Dr. H. Victor Neher, California Institute of Technology.

Tuesday, January 22, 4:30 p. m.

OUR STONE-PELTED PLANET, by H. H. Nininger, of the Nininger Laboratory.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.

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•First Glances at New Books

Ornithology

AMERICAN BIRD BIOGRAPHIES—Arthur A. Allen—*Comstock Publishing Co.*, 238 p., $3.50. Prof. Allen, who knows birds afield almost as though he were one of them himself, here gets inside their feathers and tells their stories in the first person. It is a technique that should be very effective, especially with younger readers. There are ten color plates and ten wash drawings by George Miksch Sutton, as well as many halftone illustrations.

Science News Letter, January 12, 1935

Linguistics

KEY TO AND PRIMER OF INTERLINGUA, OR LATIN WITHOUT INFLECTIONS MEANT TO BE USED AS AN INTERNATIONAL AUXILIARY LANGUAGE AMONGST PEOPLES OF VARIOUS MOTHER TONGUES—*Dutton*, 168 p., $1.25.

Science News Letter, January 12, 1935

Geology

COMPILACION DE LOS ESTUDIOS GEOLOGICOS OFICIALES EN COLOMBIA —1917 a 1933, Tomo II—Otto Stutzer and Ernst A. Scheibe—*Colombia, Imprenta Nacional (Bogota)*, 425 p. The second volume of a valuable work, of which the opening volume was reviewed on this page recently. (*SNL, Aug* 18, 1934).

Science News Letter, January 12, 1935

Botany

TREES OF NORTH AMERICA (EXCLUSIVE OF MEXICO). VOL. II—THE BROADLEAVES—George Rex Green—*Edwards Brothers, Inc., Ann Arbor*, 344 p., $3.50. The concluding volume of a new dendrological work, of which vol. I was mentioned on this page some time ago. (*SNL, Sept.* 16, 1933).

Science News Letter, January 12, 1935

Chemistry-Biology

ANALYSIS DES MÉCANISMES CHIMIQUES CHEZ LES ETRES VIVANTS —Théphile Cahn—*Hermann et Cie., Paris*, 26 p., 8 francs.

Science News Letter, January 12, 1935

Microscopy

ADVENTURES WITH THE MICROSCOPE—Julian D. Corrington—*Bausch & Lomb Optical Co.*, 455 p., $7.50. Tells how to use microscopes, all the way from the simple hand lens to the professional's elaborate research model, how to use their accessories, what things to put on the stage and how to obtain and prepare them, imparts a good deal of instruction in biology and geology, and makes brief discursions into semi-fictional situations typical of the naturalist's field adventures.

Science News Letter, January 12, 1935

Geology

THE CHANGING WORLD OF THE ICE AGE—Reginald A. Daly—*Yale University Press*, 271 p., $5.00. One of our best known historical geologists examines critically all known data on the Pleistocene, and reconstructs as nearly as can be done at the present time the map of the glacial advances and retreats. The book will be of very great professional interest to geologists, paleontologists and students of the life sciences, and it will have as well a genuine appeal for educated readers in general.

Science News Letter, January 12, 1935

Philosophy

THE SEARCH FOR TRUTH—Eric T. Bell—*Williams and Wilkins*, 279 p., $3. A mathematician with much "pawky" humor, tremendous intellectual curiosity, and no discernible reverence examines the curious antics of men, and particularly of scientific and near-scientific men, in their everlasting quest for that everlasting elusive goddess, Truth. Let no one who cannot stand having his own hide pricked read this book.

Science News Letter, January 12, 1935

Zoology

VERTÉBRÉS INFERIEURS (POISSONS, BATRACIENS, REPTILES) — Georges Bohn—*Hermann et Cie, Paris.*, 96 p., 15 francs.

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Zoology

TROPICAL FISHES AS PETS—Christopher W. Coates—*Liveright*, 226 p., $2. The author brings to the aid of the home aquarist the benefit of his experience in the department of tropical fish in the New York Aquarium. He tells what "tropicals" are, how to get the best enjoyment of their beauty, what to do for them when they are sick. There are many beautiful illustrations by S. C. Dunton, some of them in color.

Science News Letter, January 12, 1935

Microscopy

EXPLORING WITH THE MICROSCOPE —Raymond F. Yates—*Appleton-Century*, 182 p., $2. If you have an eager young naturalist in your family or among your acquaintance, you can hardly find him an inexpensive gift that will be better appreciated than this book. It tells how to use compound microscopes of the kinds most beginners have, and how to make, at little cost, such desirable adjuncts as microtome, turntable, and even an ink-bottle alcohol lamp.

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Biology

LA SENSIBILITÉ RÉFLEXOGÈNE DES VAISSEAUX AUX EXCITANTS CHIMIQUES —C. Heymans and J. J. Bouckaert—*Hermann et Cie., Paris*, 32 p., 9 francs.

Science News Letter, January 12, 1935

Education—Sociology

THE SOCIAL UNDERSTANDINGS OF THE SUPERINTENDENT OF SCHOOLS—Frederick H. Bair—*Teachers College, Columbia Univ.*, 193 p., $2. Dr. Bair, who is a successful superintendent of schools himself, "holds the mirror up to nature" of his fellows in the craft, with results sometimes devastating, occasionally complimentary, but always illuminating. Considering the tremendous influence over the development of children which can be wielded by these captains of our educational army, this study, penetrating into their minds with astonishing detail and intimacy, has great social value, at least *in posse*. Dr. Bair's inquiry was sponsored by the Social Studies Commission of the American Historical Association.

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Chemistry

GERMAN-ENGLISH CHEMICAL TERMINOLOGY—Hans Fromherz and Alexander King—*D. Van Nostrand*, 324 p., $5. A text on chemical German, giving a page of English and then opposite the equivalent German material. A complete index to material and names used is provided but no dictionary is included.

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